

R. K. LE BLOND & W. F. GROENE.
CUTTER GRINDER.

APPLICATION FILED JUNE 29, 1908.

932,791.

Patented Aug. 31, 1909.

5 SHEETS—SHEET 1.

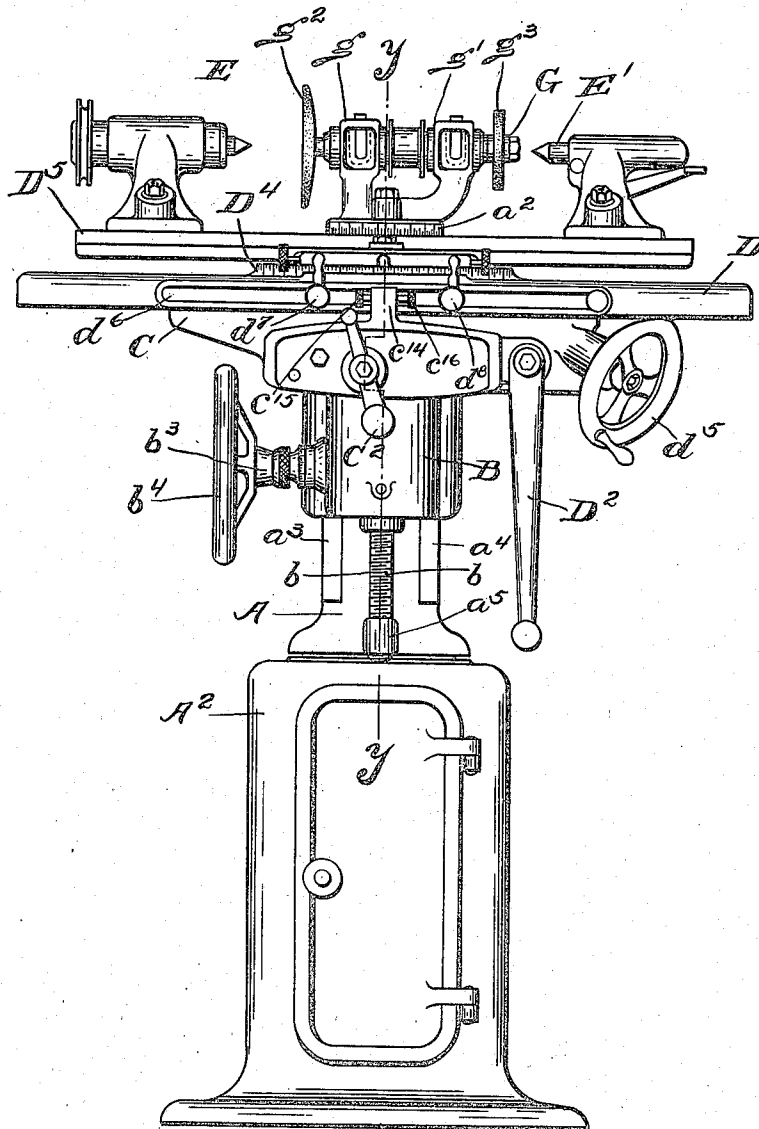


Fig. 1.

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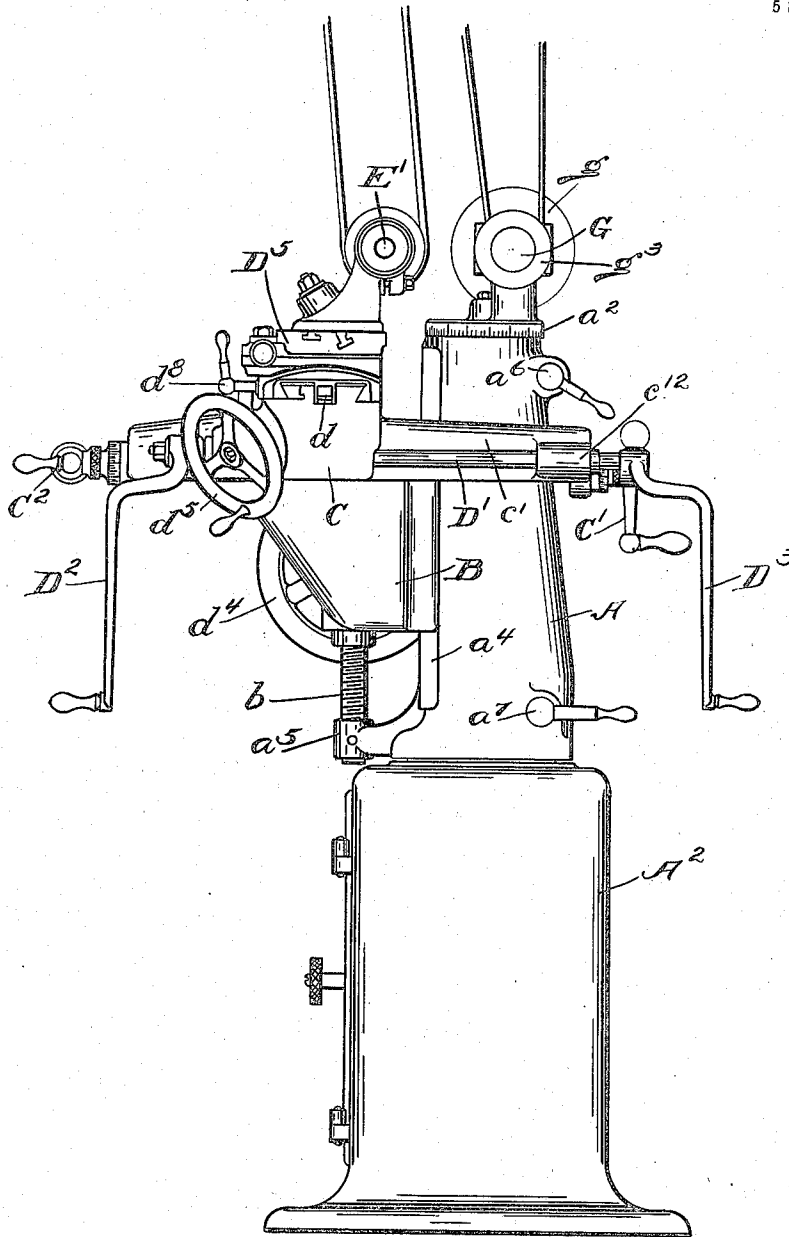


Fig. 2.

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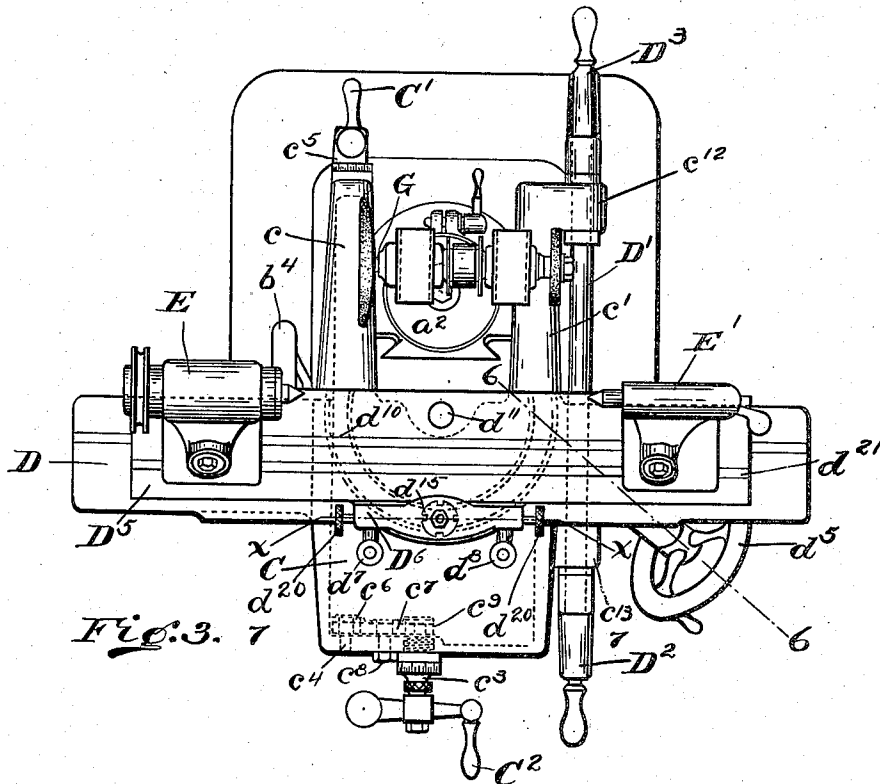


Fig. 3.

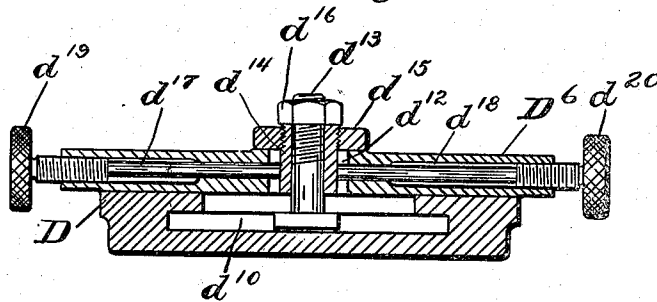


Fig. 4.

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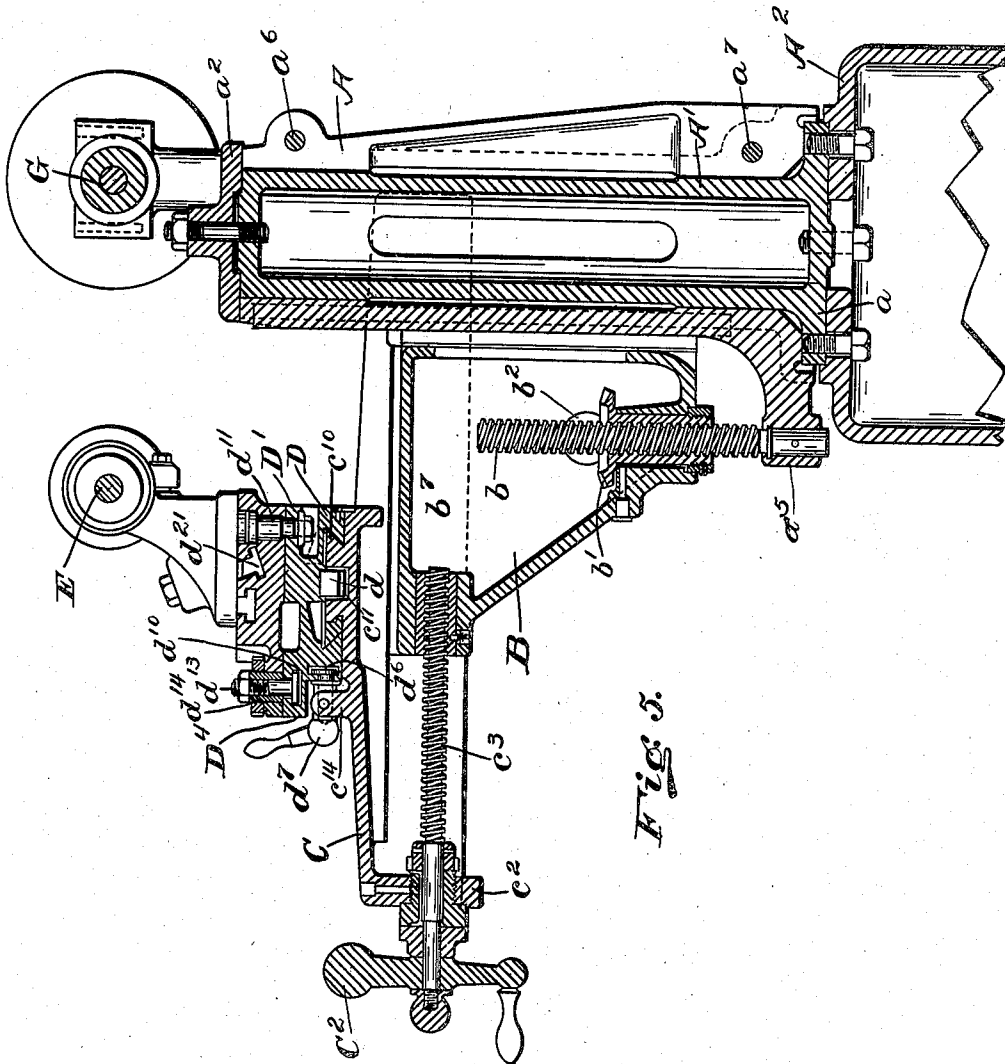


Fig. 5.

Witnesses

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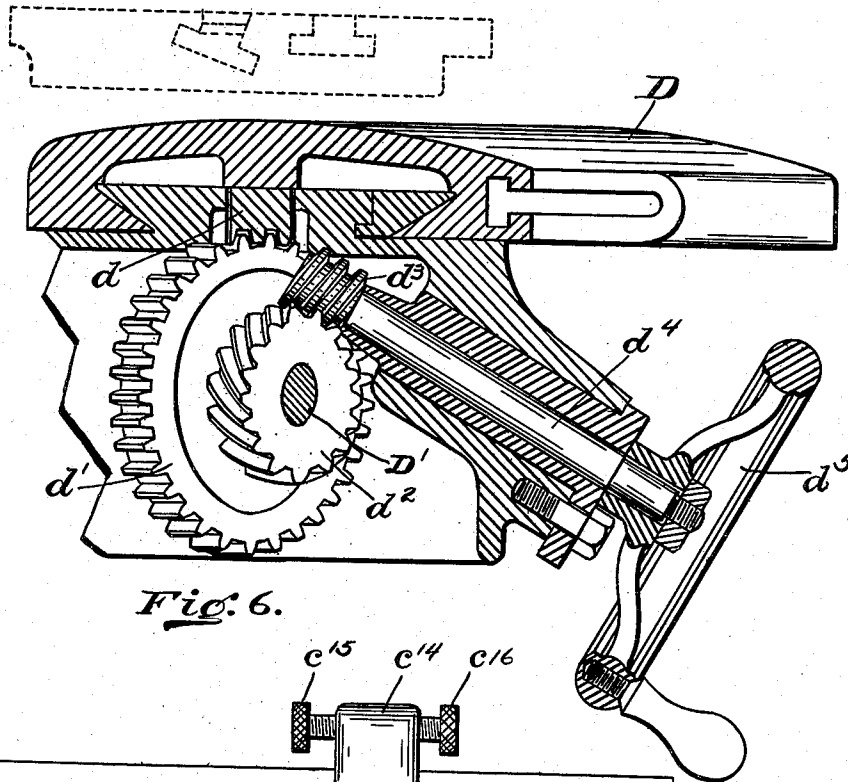


Fig. 6.

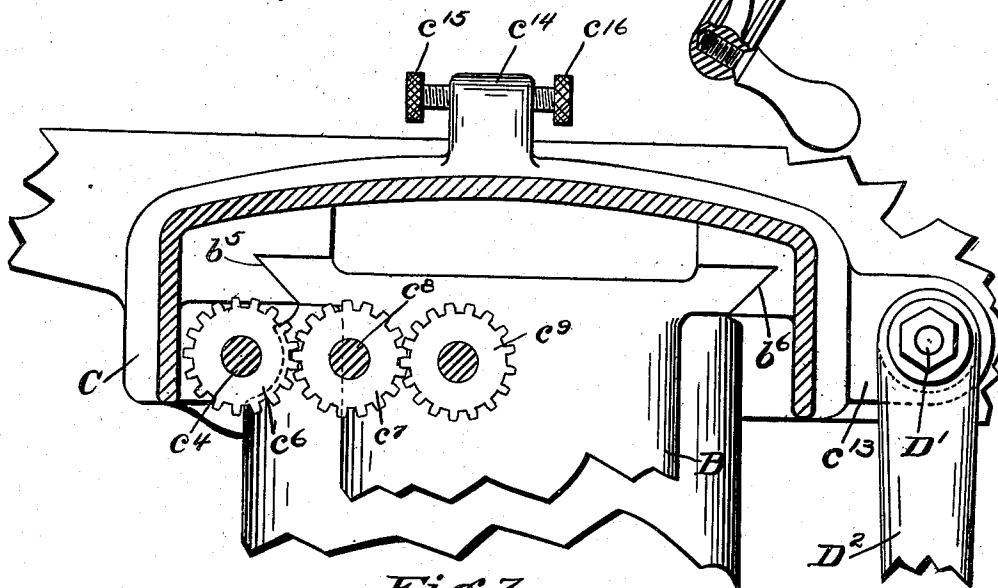


Fig. 7.

Witnesses
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UNITED STATES PATENT OFFICE.

RICHARD K. LE BLOND AND WILLIAM F. GROENE, OF CINCINNATI, OHIO, ASSIGNORS TO THE
R. K. LE BLOND MACHINE TOOL COMPANY, OF CINCINNATI, OHIO, A CORPORATION OF OHIO.

CUTTER-GRINDER.

932,791.

Specification of Letters Patent.

Patented Aug. 31, 1909.

Application filed June 29, 1908. Serial No. 440,956.

To all whom it may concern:

Be it known that we, RICHARD K. LE BLOND and WILLIAM F. GROENE, citizens of the United States of America, and residents of Cincinnati, county of Hamilton, State of Ohio, have invented certain new and useful Improvements in Cutter-Grinders, of which the following is a specification.

The objects of our invention are to simplify and render more compact the construction of cutter grinders so as to obviate the use of stems, posts, split bearings, joints, etc., to increase the capacity of these machines, to dispose the actuating levers in positions such that they will be accessible to the operator either from the front or the back of the machine to facilitate his examination of the work which is being done, and to provide for a fine adjustment of the parts in their various positions.

Referring to the accompanying drawings, in which like parts are illustrated by similar reference letters wherever they occur throughout the various views: Figure 1 is a front elevation of a cutter grinder embodying our invention. Fig. 2 is a side elevation of the same. Fig. 3 is a plan view thereof. Fig. 4 is a detail sectional view taken upon line *x-x* of Fig. 3, upon a somewhat enlarged scale. Fig. 5 is a vertical sectional view taken upon line *y-y* of Fig. 1, upon a somewhat enlarged scale. Fig. 6 is a detail sectional view taken upon line 6-6 of Fig. 3, upon an enlarged scale. Fig. 7 is a detail sectional view taken upon line 7-7 of Fig. 3, upon an enlarged scale.

Referring to the parts: a sleeve, A, is mounted to rotate upon a vertical column, A', which is secured rigidly upon the top of box, A², which may be used as a cupboard for tools, etc. Column, A' has a horizontal flange, or foot, *a*, which is secured to the top of box, A². To the top of column, A', is secured a cap, *a*². Sleeve, A, is mounted so as to rotate upon the column, A', between flange, *a*, and cap, *a*², which forms the base plate for the standards between which the spindle of the cutting wheels is journaled, as hereafter described. Sleeve, A, has formed upon it vertical ways, *a*³, *a*⁴, upon which knee, B, is mounted. Sleeve, A, has a lug, *a*⁵, in which the elevating screw, *b*, is secured. Knee, B, has mounted rotatably in its bottom a bevel pinion, *b*², whose sleeve engages

the screw threads of the elevating screw, *b*, and whose bevel teeth are engaged by a bevel pinion, *b*², which is secured upon the shaft, *b*³, which is provided with a hand-wheel, *b*⁴, for moving the knee, B, upon the ways, *a*³, *a*⁴, in a vertical direction.

Knee, B, is provided with horizontal ways, *b*⁵, *b*⁶, upon which is mounted the saddle, C. Saddle, C, has a bifurcated apron, *c*, *c*¹, which passes upon each side of the sleeve, A, and a flange, *c*², at its forward end in which is journaled cross feed screw, *c*³, which passes through a horizontal bushing, *b*⁷, which is mounted in the knee, B, whereby the rotation of the cross feed screw, *c*³, reciprocates the saddle, C, upon the knee. Arranged parallelly to the cross feed screw, is a feed shaft, *c*⁴, which is journaled at its forward end in the flange, *c*², and at its rear end in a vertical flange, *c*⁵, which projects downward from the end of the apron, *c*. Shaft, *c*⁴, at its forward end carries a pinion, *c*⁶, which intermeshes with the pinion, *c*⁷, which is mounted upon an intermediate stud-shaft, *c*⁸, which is secured to the flange, *c*². Pinion, *c*⁷, meshes with a pinion, *c*⁹, which is secured upon the cross feed screw, *c*³. The rear end of the shaft, *c*⁴, is provided with a handle, or lever, C'. The saddle may therefore be fed from the front by means of the lever, C², or from the rear by means of the lever, C'.

Saddle, C, has longitudinal ways, *c*¹⁰, which engage the groove, in the bottom of the base, D, of the table. Ways, *c*¹⁰, have a central longitudinal groove, *c*¹¹, and to the bottom of the base, D, is secured a rack, *d*, which projects into the groove, *c*¹¹, as illustrated in Fig. 5. The teeth of rack, *d*, intermesh with the teeth of a gear wheel, *d*¹, which is mounted upon the feed shaft, D', which is journaled in lugs, *c*¹², and *c*¹³, which project laterally from the saddle, C, so that the feed shaft, D', extends transversely through the machine and receives actuating levers, D² and D³ upon the front and rear of the machine, whereby the longitudinal movement of the table may be regulated either from the front or the rear of the machine. Secured upon shaft, D', adjacent to the gear wheel, *d*¹, is a pinion, *d*², which intermeshes with a worm, *d*³, upon a shaft, *d*⁴, which carries a wheel, *d*⁵, as illustrated in Fig. 6. By means of the worm, *d*³, the pinion, *d*², and

the gear wheel, d' , fine adjustments of the longitudinal movement of the table are obtained.

We have provided a stop for the longitudinal movement of the table, which is constructed in the following manner: The saddle, C, has a central lug, c^{14} , with a longitudinal screw-threaded bore, in which are seated screws, c^{15} , c^{16} , as illustrated in Fig. 7. Base, D, has upon its front a T-groove, d^6 , in which are seated stop-bolts, d^7 , d^8 , which may be adjusted to the position desired in the way, d^6 , to obtain the rough adjustment. The finer adjustment for the stop is obtained by adjusting the screws, c^{15} , c^{16} . When either the stop bolt, d^7 , or d^8 , contacts the screw, c^{15} , or c^{16} , the movement of the table is stopped.

Base, D', has a semi-circular swivel platform, D⁴, in which a semi-circular T-way, d^{10} , is formed. Table, D⁵, is swiveled upon the platform, D⁴, in the following manner. In the rear of the table has a central pivot bolt, d^{11} , which is secured to the base, D'. Upon the front of the table, D⁵, is a forwardly projecting ledge, D⁶, diametrically opposite pivot bolt, d^{11} . Ledge, D⁶, has a perforation, d^{12} , through which a bolt, d^{13} , passes, into the T-way, d^{10} , within which the head of the bolt is adapted to slide. The head of the bolt is larger than the neck of the T-way. Surrounding the bolt, d^{13} , is a sleeve, d^{14} , which is of a diameter less than the hole, d^{12} , but greater than the diameter of the neck of the T-way, so that the lower end of sleeve, d^{14} , rests upon the top of the swivel base, D⁴, as illustrated in Fig. 5. Sleeve, d^{14} , is externally screw-threaded at its upper end, d^{15} . The bolt, d^{13} , has a nut, d^{16} , to contact the end of the sleeve, d^{14} . Ledge, D⁶, has longitudinal bores, d^{17} , d^{18} , leading into the perforation, d^{12} , and in which are seated screws, d^{19} , d^{20} to contact the sleeve, d^{14} , upon diametrically opposite sides. By loosening the nuts, d^{15} , and d^{16} , the table, D⁵, may be rotated about the pivot, d^{11} , to approximately the desired angle to the spindle. The fine adjustment is attained first by tightening down the nut, d^{16} , which clamps the edges of the metal adjacent to the neck of the T-way between the sleeve, d^{14} , and the head of the nut, d^{16} , thereby fixing the said nut and sleeve in a stationary position. The table, D⁵, may then be adjusted by means of the screws, d^{19} , d^{20} , in one direction or the other by screwing one of the screws out and screwing the other screw inward, to move the table, D⁵, relatively to the sleeve, d^{14} , the play between the walls of the perforation, d^{12} , and the periphery of the sleeve, d^{14} , permitting this fine adjustment. After this adjustment has been secured, the table, D⁵, is locked in place by screwing down the nut, d^{16} . It is to be noted that this fine adjustment of the table,

D⁵, may be obtained at any point within the one hundred and eighty degrees of the movement of the table upon the swivel. For guidance in obtaining this adjustment the swivel platform, D⁴, is graduated upon its periphery. The live and dead centers, E, E', for holding the work, are mounted in ways, d^{21} , upon the table.

We will now describe the means of mounting the spindle of the grinding wheels. Plate, a^2 , is bolted to the top of the column, A', and has in the rear of its longitudinal diameter two standards, g , g' , in which spindle, G, is mounted. Standard, g , projects vertically upward from the plate, a^2 , within the circumference of said plate, while standard, g' , is curved outward beyond the circumference of the plate, a^2 , so that the journal bearing of the standard, g , is within the vertical plane passing through the circumference of the plate, a^2 , and the journal bearing of the standard, g' , projects beyond such a plane. Spindle, G', may receive emery wheels, g^2 , g^3 , of the character desired.

In use the sleeve, A, may be rotated to bring the saddle to any desired angle relatively to the spindle, G, of the cutters, simply by loosening the clamping bolts, a^6 , a^7 . When the saddle is adjusted so as to bring the table, D⁵, parallel to the spindle, G, and upon the side of the column opposite that upon which the spindle, G, is located, it is seen that the maximum distance between the spindle, G, and the work holding centers, E, E', is increased, thereby enabling the machine to cut work of an increased diameter, whereas, when the sleeve is turned to bring the saddle upon the same side of the column as the spindle, G, it is seen that the minimum distance between the spindle, G, and the centers, E, E', is diminished, thereby enabling the grinder to cut work of a more diminished diameter. The capacity of the machine is thus increased by the mounting of the spindle eccentrically to the column. Because of the ability to rotate the sleeve about the column, and also to adjust the knee vertically upon the rotating sleeve, work which is carried between the centers, E, E', may be brought in front of the face of the cutter, g^2 , or g^3 , and beneath the centers of said cutter grinders. This position would be one at about ninety degrees to the left or to the right of the position illustrated in Fig. 1. In this position it is seen that form cutters, hobs, or reamers which are supported between the centers could be ground upon their radial faces, while held between centers, E, E'.

When it is desired to grind tapered work, it is mounted between the centers, E, E', and adjusted to any position desired in relation to the grinding wheels, g^2 , g^3 , by loosening the nuts, d^{15} , d^{16} , and adjusting the table to

the approximate position by rotating it by hand. Then the fine adjustment is obtained by means of the screws, d^{19} , d^{20} , as heretofore described. It is seen that this fine adjustment may be made at any point in the travel of the table.

In the operation of cutting, the operator at times finds it convenient to stand in front of the work, and at times to stand in the rear of it. By means of the levers, C^2 , and D^2 , the cross feed of the saddle and the longitudinal feed of the table may be worked from the front of the work while by means of the levers, C^1 , and D^3 , these same operations can be carried on from the rear of the work, thus permitting the operator to assume the position in relation to the work more advantageous for him.

What we claim is:

1. In a cutter grinder the combination of a column, a spindle mounted to one side of the center of the column, a grinding tool carried by the spindle, a knee mounted to rotate around the column, and means for holding the work upon the knee.

2. In a cutter grinder the combination of a column, two standards mounted eccentrically upon the column, and one of the standards projecting beyond and the other standard standing within the periphery of the column, a spindle journaled in the standards, a knee mounted rotatably upon the column, a work holding device mounted upon the knee, and means of feeding said device toward and from the spindle.

3. In a cutter grinder having a column, a knee and a saddle mounted to reciprocate upon the knee, the combination of a cross feed screw mounted in the knee and engaging the saddle, a main lever engaging the cross feed screw, and a supplementary lever extending from the side of the cutter opposite to that of the main lever and coupled to the cross feed screw, whereby an operator may feed the saddle from a position either in front or in the rear of the saddle.

4. A cutter grinder having a table base with semi-circular ways, a table swiveled upon the ways, a member carried by the table adapted to move in engagement with the base, means for locking said member to the base and an adjusting screw carried by the table engaging the said member to move the table relatively to said member when it is locked to the base.

5. A cutter grinder having a base for a table with semi-circular ways, the table mounted to swivel upon the ways, a post carried by the table and adapted to slide in the ways, means of locking the post in the

ways, and means carried by the table for engaging the post to adjust it in relation to the post.

6. A cutter grinder having a base for a table with semi-circular ways, the table mounted to swivel upon the ways, a post carried by the table and adapted to slide in the ways, means of locking the post in the ways, screws in the table and abutting against the post to adjust the table in relation thereto.

7. A cutter grinder having a column, a knee, a table in combination with a feed lever situated in front of the table, a second feed lever in the rear of the table, and a means of coupling said feed levers to the table to reciprocate it upon the knee.

8. A cutter grinder having a column, a knee, a saddle and a table in combination with a feed lever situated in front of the knee, a second feed lever situated in the rear of the knee and a means of coupling said feed levers to the saddle to impart a transverse reciprocation to it, and a third feed lever situated in front of the table, a fourth feed lever situated in the rear of the table and a means of coupling the third and fourth levers to the table to impart a longitudinal reciprocation to it.

9. In a cutter grinder the combination of a column, a knee carried by the column, a bifurcated saddle mounted upon the knee and straddling the column, a table mounted upon the knee, two operating screws supported upon each side of the column by the saddle, one adapted to reciprocate the saddle and the other adapted to reciprocate the table.

10. In a cutter grinder having a member with longitudinal ways and a table adapted to be reciprocated upon the ways the combination of a vertical lug upon said member adjacent to the table, having ways upon its side adjacent to the lug, stop bolts adapted to be secured in various positions in the ways upon the table, and adjusting screws mounted in the lug to contact the stop bolts.

11. In a cutter grinder the combination of a column, a sleeve mounted rotatably upon the column and having vertical ways formed upon it, a knee mounted upon the ways upon the sleeve, an elevating mechanism mounted upon the sleeve and engaging the knee, and a grinding tool mounted upon the column.

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